CLAIMS

What is claimed is:

1. A system for forming a silicide on a silicon material, said system comprising:

a vacuum chamber adapted to hold said silicon material under a vacuum environment;

a metal formation tool connected to said vacuum chamber and being adapted to form metal on said silicon material while said silicon material is under said vacuum environment within said vacuum chamber; and

a heating tool connected to said vacuum chamber and being adapted to heat said silicon while said silicon material is under said vacuum environment within said vacuum chamber.

2. The system in claim 1, further comprising a etch tool external to said vacuum chamber and being adapted to perform etching of said metal after said silicon material is removed from said vacuum chamber.

3. The system in claim 1, wherein said vacuum chamber comprises a plurality of connected vacuum chambers adapted to maintain said silicon material in a continuous vacuum environment while said metal formation tool forms said metal and while said heating tool heats said silicon material.

4. The system in claim 3, wherein said vacuum chambers comprise:

a first vacuum chamber to which said metal formation tool is attached;

a second vacuum chamber to which said heating tool is attached; and

a third vacuum chamber adapted to maintain said vacuum environment while transporting said silicon material from said first vacuum tool to said second vacuum tool.

5. The system in claim 1, wherein said heating tool is adapted to heat said silicon material to temperatures between 300°C and 400 °C to form a metal rich silicide or between temperatures of 450 °C and 550 °C to form a monosilicide.

6. The system in claim 1, further comprising a second heating tool.

7. The system in claim 6, wherein said second heating tool is adapted to heat said silicon material to temperatures above 600 °C to form a disilicide.

8. A system for forming a silicide on a silicon material, said system comprising:

a vacuum chamber adapted to hold said silicon material under a vacuum environment;

a metal formation tool connected to said vacuum chamber and being adapted to deposit metal on said silicon material while said silicon material is under said vacuum environment within said vacuum chamber; and

a heating tool connected to said vacuum chamber and being adapted to heat said silicon simultaneously while said metal formation tool forms said metal on said silicon material such that a silicide material is formed as said metal is deposited on said silicon materal.

9. The system in claim 8, wherein said heating tool comprises a heated chuck within said vacuum chamber and is adapted to hold said silicon materal.

10. The system in claim 9, wherein said heated chuck comprises a resistive heater.

11. The system in claim 8, further comprising a etch tool external to said vacuum chamber and being adapted to perform etching of said metal after said silicon material is removed from said vacuum chamber.

12. The system in claim 8, wherein said heating tool is adapted to heat said silicon material to temperatures between 300°C and 400 °C to form a metal rich silicide or between temperatures of 450 °C and 550 °C to form a monosilicide.

13. The system in claim 8, further comprising a second heating tool.

14. The system in claim 13, wherein said second heating tool is adapted to heat said silicon material to temperatures above 600 °C to form a disilicide.

15. A method of forming a silicide on a silicon material comprising:
placing said silicon material in vacuum environment;
forming metal on said silicon material without breaking said vacuum environment; and
heating said silicon surface and said metal without breaking said vacuum environment.

16. The method in claim 15, further comprising performing additional heating of said silicon surface.

17. The method in claim 16, wherein said heating forms a monosilicide and said additional heating forms a disilicide.

18. The method in claim 16, wherein said heating is performed at temperatures between 300°C and 400 °C to form a metal rich silicide or between temperatures of 450 °C and 550 °C to form a monosilicide, and said additional heating is performed at temperatures above 600 °C to form a disilicide.

19. The method in claim 15, wherein said processes of forming said metal and said heating of said silicon are performed simultaneously without breaking said vacuum environment.

20. The method in claim 15, wherein said metal comprises one of Cobalt and Nickel.